

8

PATTISON PRIZE IN CLINICAL SURGERY.

Notes on twelve cases treated in the University
Surgical Wards of the Royal Infirmary, Edinburgh,
during the Academic Year, 1913-14.

Andrew J. Caird.

Pattison Prize Essay Edin. 1914.



Notes on three cases of DIABETIC GANGRENE
treated surgically, with special reference
to the methods of ANAESTHESIA employed.

The surgeon is somewhat hampered in his choice of an anaesthetic suitable for a diabetic patient. The use of a General Anaesthetic such as chloroform or ether is attended with considerable risk, as these are bound to cause a further upset to the general metabolism of the body, already deranged by the diabetic condition. It is well known also that the administration of chloroform, even in the healthy individual, tends to induce a temporary glycosuria. This tendency is equally strong in the diabetic patient, and might determine such an exacerbation of the disease as to bring on, a few days after the operation, a condition of diabetic coma, and death. Ether does not act in this way so powerfully as chloroform, and it is found that where a general anaesthetic is considered necessary, if ether is given throughout, by the open method, the danger of inducing coma is one which can be faced with a fair amount of safety. Nevertheless, the indication is to avoid a general anaesthetic, wherever possible.

In operations for amputation of the lower limb for diabetic gangrene, the method of Spinal Anaesthesia is invaluable./

invaluable. The patient is placed in the sitting posture, with head bent and back arched, so as to open up the spaces between the vertebral laminae. By means of a syringe and a long needle which is inserted into the theca vertebralis between the second and third, or between the third and fourth lumbar vertebrae, 1 c.c. of 2% tropacocaine is slowly injected into the spinal canal. The feet of the patient are then elevated. The anaesthesia, which begins in the perineum, is noticed later in the feet, and gradually extends up the legs, over the pelvis, and on to the abdomen often as high as the umbilicus. It is complete in about twenty minutes.

The great advantage of this method of anaesthesia is that it renders the amputation possible, without having any harmful effect on the diabetic condition. There is one attendant risk, however, which should be mentioned. The gangrene of the limb, which is almost invariably of the moist, septic type, involves a certain degree of septicaemia. It is conceivable that the needle used for lumbar puncture might carry organisms from a vessel it had punctured into the spinal canal, and so originate a septic meningitis. But this risk is so small as to be almost negligible.

For amputations of the upper limb the same method of Spinal Anaesthesia by "upper dorsal puncture" (between the first and second dorsal vertebrae) has also/

also been advised and practiced. But the risk of anaesthetising at the same time the vital centres in the medulla renders it so dangerous that it is scarcely to be recommended.

Other methods, however, are available for the upper limb.

Ordinary Local Anaesthesia by infiltrating with $\frac{1}{2}\%$ solution of novocaine the parts through which the incisions are to be made, has been tried. The practical difficulty encountered is that of obtaining complete infiltration of all the nerves, and of the bones; so that the anaesthesia is not complete, and the operation attended with pain.

A method of Regional Anaesthesia, by infiltrating with novocaine the nerves of the Brachial Plexus has been introduced by Kulenkamph. The patient is placed in the sitting posture, and the shoulder depressed. At a point in the mid-clavicular line, immediately lateral to the spot where the pulsations of the sub-clavian artery can be felt, a long needle is introduced, and thrust in the direction of the third Dorsal Spine until it strikes the nerves of the plexus. A prickly sensation which the patient feels in his fingers, along the distribution of the median nerve, indicates that the plexus has been pierced by the needle. By means of a syringe, 20 c.c. of a 2% solution of novocaine is introduced into the plexus, the point of the needle being shifted a little during the injection to ensure complete/

complete infiltration. Anaesthesia is complete in the arm after 15 minutes.

The advantages of this kind of anaesthesia over general anaesthesia are obvious.

One disadvantage is sometimes met with, namely, considerable difficulty in respiration during the operation. This may be due to infiltration by the novocaine of the phrenic nerve, or of the apex of the lung - not necessarily or probably by direct injection through a mis-directed needle, but on account of the large amount (20 c.c.) of the solution employed.

The two methods of Regional Anaesthesia above described, viz:-

- (1) Spinal Anaesthesia,
- (2) Anaesthesia by Infiltration of Brachial Plexus,

are illustrated in the two cases of diabetic gangrene which follow. The second of these cases also serves to illustrate two other methods of (local) anaesthesia, viz:-

- (1) Anaesthesia by injection of novocaine.
- (2) Anaesthesia by freezing with Ethyl Chloride.

The third case is one in which a general anaesthetic was employed.

Case 1. Diabetic Gangrene of Right Foot.

Mrs. Jeffrey, aet. 45. Admitted to Ward 8,
31st January, 1914.

History. During the last three or four months of
1913/

1913 patient had felt unwell. She complained of persistent thirst; her appetite failed. Being dyspeptic she was put on a diet of milk and bovril by her doctor. Nevertheless she lost weight, and felt weak, particularly in the legs, so that she required the aid of a stick in walking.

These symptoms were accompanied by great frequency of micturition, patient having to pass water twelve times a day and several times during the night. Micturition was attended with a burning pain.

On December 14th, 1913, she noticed a black spot under the nail of her right great toe. The toe swelled at first, then shrivelled, while the black spot increased in size.

A few days later patient had the misfortune to upset some boiling soup over both her feet, which were rather severely burned. At this point she took to bed.

By 10th January, 1914, while the left foot was recovering from its burn, the right foot was swollen, blistered and very painful.

On 26th January, patient's doctor amputated the great toe. The gangrene, however, was not arrested, but spread quickly on to the foot. Her general condition also showed no improvement, it got rather worse. Patient became very drowsy; had considerable pain/

pain after food, with immediate vomiting; her bowels which before had been regular became constipated.

On 31st January she was sent to the Infirmary and admitted to Ward 8.

Patient's previous health had always been good.

There is nothing of interest to note regarding her family history and her surroundings and habits.

Condition on Examination.

General. Pulse 100: Temp. 101°: Respirations 24.

Patient was stout and well nourished.

Tongue was dry and glazed: lips dry: teeth bad.

Over her back and arms was a rash, which was itchy, along with considerable pigmentation of the skin.

Her mental condition was dull.

Local. Left Leg and Foot:- Some pigment-mottling of the leg, but no oedema was present. On the foot marks of the burn, now nearly healed, were visible.

Right Leg and Foot:- The leg was oedematous, and inflamed in its lower third. The great toe was absent. A large black slough appeared on the inner and plantar aspects of the foot, suggesting the area supplied by the posterior tibial artery. Over this black area/

area both sensation and normal temperature were absent. There was also an oily exudate, suggestive of disintegrating fat.

Femoral Arteries. Pulsations were strong on the left side, but weak on the right side.

Urine. Amount, 20 oz. per day.

Sp. gravity, 1018.

Reaction acid.

Urea, 5 grs. per oz.

It contained Pus, Albumin, Sugar (5 gr. per oz.), Acetone.

It did not contain diacetic acid.

The physical examination, along with the history supplied by the patient, and backed by the condition of the urine, made the diagnosis of Diabetic Gangrene certain.

The cause of the gangrene was found in the condition of the femoral arteries - viz., an endarteritis, due to the abnormal constituents in the blood, which had caused gradual narrowing of the lumen of the right vessel, and so impoverished the blood supply of the foot. The history of the shrivelled toe suggested that the gangrene was at first of the dry type; it is likely that the burn from the spilled soup, along with the general diabetic condition, determined the change of the nature of the gangrene to the moist variety.

Surgical/

Surgical Treatment.

Professor Caird.

Gritti-Stokes Amputation, under Spinal Anaesthesia.

Anaesthetic was administered in the way detailed above.

A Tourniquet was applied round the thigh.

A short posterior, and a long anterior flap containing the patella, was made. The femur was sawn across above the condyles, and the articular surface of the patella was also removed by the saw. The vessels in the popliteal space were ligatured and the nerves cut short. The sawn surfaces of patella and femur were sutured in apposition by catgut. The tourniquet was removed, and all the bleeding points clamped and ligatured. The flaps were secured together with silk-worm gut and interrupted horse-hair sutures, and a rubber drain inserted at each end of the wound. The usual dressings and bandages were applied.

During the operation patient suffered practically no pain, save when the sutures in the popliteal space were being divided.

Progress. There were no unpleasant after-effects of the anaesthetic.

Wound. The wound healed well, though slowly, and the stitches were taken out on the 20th day.

About the 20th day, however, a patch of skin in the posterior flap, about the size of a shilling was noticed to be reddened, and appeared about to slough/ened

Stitching
9

slough. It did this, and there was also some sloughing of subcutaneous tissue. The part was dressed, every day, and by the 63rd day the discharge had diminished sufficiently to allow the patient to go home.

Urine. The urine was tested frequently to ascertain the presence or absence of sugar. The changes which it showed are remarkable. On the 4th day after the operation, sugar had disappeared altogether from the urine. On the 24th day, i.e. when the gangrene had started again in the stump, sugar was found again in the urine. Glycosuria continued and was still present when patient was discharged.

Case 2. Diabetic Gangrene of Right Hand.

Shaw, aet. 31. Admitted to Ward 7,
12th February, 1914.

History. Since April 1912 Patient has been treated at various times in the Medical wards for diabetes, with considerable benefit.

In January 1914 he began to go downhill. The first signs of gangrene appeared in his right forefinger about January 10th. The finger became blue and cold, sensation was lost; and as the gangrene spread and became septic, pus gathered in the palm of the hand, and the other fingers became involved.

On 17th January, after being frozen with Ethyl Chloride the palm was freely incised and pus escaped.

By 2nd February the suppuration had extended to the wrist/

wrist joint which became disorganised and very painful. Five days later patient experienced pain in the left elbow, which he dislocated while turning in bed. The dislocation was easily reduced and was evidently caused by a secondary abscess which had involved the joint. A similar abscess also appeared on the anterior aspect of the Left Tibia. The right hand was by this time so painful that patient was anxious to have it removed.

On 12th February he was therefore admitted to Ward 7 for treatment.

Condition on Examination.

Patient was very emaciated and appeared very ill. The local conditions of gangrene and abscesses were as already described.

Pulse 130. Temp. 101°.

Urine. Amount was 250 oz. daily.

It contained - Sugar, 25 gr. per oz.
Diacetic acid.
Acetone.

Operations. (1) 13th February, 1914. Mr. Caird.

Anaesthetic. The limb was anaesthetised by infiltrating the brachial plexus in the manner already detailed. It is interesting to note that after the novocaine was injected an area of hyperaemia was evident over the lower part of the neck and upper part of the thorax, as low down as the second rib. There was no hyperaemia of the arm. It is worthy of note, also, that the patient, when the injecting needle struck the plexus, /

plexus, felt a prickling in his fingers, even though these fingers were involved in the gangrene, and were dead to tactile sensation.

Amputation was performed by a circular incision four inches above the wrist.

| | | | | |
|---------|--------------------------------------|---|---|-----|
| Pulse - | before the operation was | . | . | 114 |
| | at the commencement of the operation | . | . | 134 |
| | while the bones were being divided | . | . | 140 |
| | Thereafter | . | . | 136 |

(2) 14th February. Under local anaesthesia, produced by infiltrating the skin and subcutaneous tissues with $\frac{1}{2}\%$ novocaine with adrenalin, the abscess over the left tibia was incised, and the left elbow also opened and drained.

Progress. Patient slept well from the beginning and appeared better generally. The sugar in the urine, which before operation stood at 25 gr. per oz. fell on 15th February to 14 gr. in the morning, and rose to 28 gr. in the evening. Next day - the fourth day after operation - the sugar had disappeared. Acetone and diacetic acid however were still present. That morning patient was very weak and died at 1 p.m.

The Sectio showed the probable cause of death to be a streptococcal pyaemia. Abscesses were found in left forearm, left tibialis anticus, external oblique muscle, liver, spleen and left kidney. There was also a phthisical condition of the lungs, and toxic changes were marked in the heart and abdominal viscera.

Case 3. Diabetic Gangrene of Left Foot.

Wm. Reid, aet. 58. Admitted to Ward 10,
13th March, 1914.

History. In January 1914 patient had a callosity on the plantar aspect of his left great toe which caused him some pain in walking. He cut this with scissors in January, but this gave no relief from pain.

After two months he consulted his doctor, because the toe had begun to go black. The doctor diagnosed diabetes, and treated the general condition with considerable benefit. Local treatment of the toe did not arrest the gangrene. The whole toe became involved.

On March 13th patient was admitted to Ward 10 with a view to surgical interference. At that time the whole toe was gangrenous and septic, and there was a distinct line of demarcation at the metatarso-phalangeal joint. The urine contained albumin, blood and sugar, and had a specific gravity of 1031.

First Operation. March 14th. Mr. Miles.

Anaesthetic - Ether throughout, given by the open method.

Amputation - The great toe and the head of the first metatarsal were removed. There were no flaps. The wound was left to granulate.

Progress was disappointing from the first. On March 16th the edges of the wound appeared black, and from that time onwards there was a slow spread of the gangrenous/

gangrenous condition, which was never very extensive, until March 29th when he left hospital and was dressed at home by his doctor.

About a week later he began to notice a numb feeling and slight pain in the second, third and fourth toes of the left foot. These toes gradually became discoloured, cold, and insensitive; the wound of the first operation sloughed, and little by little the gangrenous process crept on to the dorsum of the foot.

On April 30th patient was readmitted to Ward 10 in order to have the leg removed. On this date all the toes save the little toe were dead. The gangrene involved the dorsum of the foot to a slight extent, and there was no definite line of demarcation. The urine was as before - specific gravity 1031, and containing albumin, blood and sugar.

Second operation. May 1st, 1914. Mr. Miles.

Anaesthetic - Open Ether throughout.

Amputation - Miller's amputation through the knee joint. A circular incision was made through the skin a hand's breadth below the level of the joint. The skin was then retracted and dissected up as far as the joint. The knee was then slightly flexed, and access gained to the interior of the joint by cutting through the ligamentum patellae. The knife was introduced between the semilunar cartilages and the tibia and the capsule of the joint divided. Flexion was increased to a right angle and the cruciate and lateral ligaments divided./

divided. There remained only the structures in the popliteal space to cut through. The femoral vessels were compressed by an assistant at the saphenous opening before this was done. After the leg was thus freed, the vessels were ligatured separately and the nerves cut short. A rubber drain was inserted through a stab wound in the posterior skin flap, and the flaps stitched with horsehair in a horizontal line.

Progress, - was uneventful from the beginning. The wound healed perfectly, without any sign of recurring gangrene. The urine - which was examined daily for a week and at intervals thereafter, was never free of sugar, even until the 16th day, when patient was discharged.

A number of interesting points are raised in the comparison of these three cases.

Of these the most remarkable perhaps is the influence of operation on the glycosuria. In the first two cases sugar disappeared from the urine on the fourth day after operation; in the third case sugar was always present.

The case of Mrs Jeffrey, in which the glycosuria disappeared with the gangrene of the foot, and reappeared with the gangrene in the stump, would almost suggest that the cases of sugar in the urine which are thus/

thus cured by operation are not true cases of diabetes at all, but of simple glycosuria such as is found in association with boils and carbuncles, and which are relieved as soon as the purulent focus is removed.

The case of Shaw, however, disproves this suggestion - because not only was he a man with a distinct diabetic history extending over two years, but also sugar disappeared from his urine while many purulent abscesses still existed in his body.

The reason why the glycosuria did not reach the same happy conclusion in the third case is difficult to ascertain. One would like to be able to say that it was the administration of ether which determined its continuance, and that if the operation had been done under spinal anaesthesia, the effect on the sugar would have been the same as in the other cases; but there are not sufficient observations to justify this conclusion. It is certain, however, that the ether was not without some detrimental effect on the diabetic condition, and it is probable that it may have aided in keeping up the glycosuria.

In comparing the two leg amputations (cases 1 & 3) one cannot but notice that in Case 1, where a tourniquet was applied, gangrene recurred in the stump, that in case 3, where the femoral vessels were simply compressed, the flaps healed well. The tourniquet is apt to devitalise to some extent the parts it renders anaemic, and is better avoided, if possible, in cases where
(as/

(as here) there is a definite risk of gangrene in the wound.

It is interesting to note also that in each of these three cases some palliative or minor form of surgical interference was attempted, before the bolder amputation of the limb was performed. In cases 1 and 3, a toe was removed; in case 2, abscesses were opened in the neighbourhood of the gangrenous finger. One cannot help thinking that in the case of Shaw, if the arm had been amputated as it finally was, whenever the signs of gangrene were manifest in the index, the pyaemia might have been wholly avoided, and his life saved; that in the case of Mrs Jeffrey, if the leg had been amputated instead of the toe, the gangrenous condition would not have got such a hold, would not have poisoned the system so much, so that the stump might have healed well in spite of the tourniquet; that in the case of Reid, if bolder measures had been adopted from the first, he might have been saved the repeated administration of ether, which can have done no good to his general condition.

The practical considerations which are thus suggested by a consideration of these cases of diabetic gangrene may be summed up thus:-

In view of the possibility of successful results of amputation in these cases, it is suggested

(1) That the surgeon should be called early - whenever, in fact, gangrene appears.

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- (2) That he should amputate well above the site of gangrene, through healthy tissue, even though a line of demarcation be present.
 - (3) That the use of a Tourniquet is contra-indicated.
 - (4) That some form of Local or Regional Anaesthesia is to be preferred to a general anaesthetic, because the immediate risk to the patient is less, and because it does not hinder the tendency to the post-operative cessation of glycosuria.
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Notes of NINE CASES OF ACUTE ABDOMINAL TROUBLE with special reference to their differential diagnosis.

The list of acute abdominal cases discussed below is by no means exhaustive or representative of those which call for immediate operation on "waiting days" at the Infirmary, but some are unusual, and others seem to illustrate several diagnostic points. They may be divided up into two sets:-

- A. Four cases of various lesions which illustrate difficulty of diagnosis.
 - 1. Ruptured Colloid Carcinoma of Caecum.
 - 2. Ruptured Gangrenous Gall Bladder.
 - 3. Acute Pancreatitis.
 - 4. Ruptured Ectopic Gestation.
- B. Five cases of Mechanical "Stoppage of the Bowel".
 - 5. Obstruction from T. B. Adhesions.
 - 6. Gall Stone Ileus.
 - 7. Volvulus of Caecum.
 - 8. Acute Intussusception.
 - 9. Obstruction from Carcinoma of Colon.

The abdomen contains such a variety of viscera, each with its own pathology, that the diagnosis of acute trouble in this region of the body is seldom a simple matter. It is almost unfortunate, from a diagnostic point of view, that Nature has elected to place so many important organs on the right side of the/

Tuberculous

Might have been better expressed.

the abdomen, which may give rise to acute symptoms. Thus on this side are found, the gall bladder, which may be associated with severe cholecystitis and formation of gall-stones, or which may become gangrenous and rupture; the duodenum, which may be ulcerated, and perforate; the caecum, which may be the site of carcinoma, which may be lax and give rise to a volvulus, which, with or without any obvious reason, may be the starting point of an intussusception; the appendix, which may become inflamed and necrotic; an ovary which may be the site of a cystic adenoma with the risk of rupture or twisted pedicle; a Fallopian Tube which may swell with pus until it bursts, or which may contain an ectopic gestation, with the grave danger of rupture and haemorrhage. To this list of "possibilities", one must add other abdominal organs not located specially in the Right side - the stomach which may ulcerate and rupture; the small intestine which may become obstructed by adhesions or kinks, or by bodies such as gall stones, or which may get strangulated as in a hernia; the colon which is liable to malignant stricture; the pancreas which may become acutely inflamed; and the left ovary and tube which present the same risks as their fellows on the right.

It is remarkable with what regularity the subjects of acute abdomen state their complaint as "Pain and Vomiting". The fact that pain and vomiting are present is/

is therefore in itself of no diagnostic value whatever.

One must have full and detailed information about these cardinal symptoms. This illustrates how extremely important it is to obtain from the patient an exact and chronological history of the attack. In eliciting this history special attention should be paid (1) to the pain, inquiry being made as to its mode of onset (whether it be suddenly intense as in ruptured ulcer, or gradual as in volvulus, for example); as to its site or sites (where it first appeared, whether it became localised or general): (2) to the vomiting, noting its frequency (whether it be repeated as in obstruction, and peritonitis); its character (whether it be spontaneous, without retching, as again in obstruction and peritonitis); the nature of the vomit (whether it be blood-streaked, as in gastric ulcer, or stercoraceous, as in obstruction): (3) to the action of the bowels, finding out whether a motion has been passed since the onset of pain - which may happen in appendicitis or ruptured tubal pregnancy, for instance; whether flatus has passed (its absence indicating 'stoppage of the bowel' but giving no hint as to the nature of the obstruction); whether anything else has been passed - as blood and mucus, for example in intussusception.

A history of the patient's previous health is often of considerable importance and help. A hint of the nature of the acute condition is frequently obtained from/

from the knowledge of previous illnesses.

A statement of the patient's family history is at least interesting and not infrequently helpful. It may suggest, for example, T. B. or carcinoma, both of which, by adhesions and stricture respectively, may give rise to acute trouble.

Tuberculosis

It is conceivable that one might make a diagnosis from the patient's histories alone. Some of these, as for example in perforated duodenal ulcer and appendicitis are so typical as to be in themselves diagnostic. But this is the exception rather than the rule, and in all cases the history must be supplemented by physical examination. Here the chief points to notice are:-

(1) The General Condition, what degree of collapse, if any, is present (whence an indication is got of the severity of the lesion); whether the patient is anaemic (noting whether the anaemia existed before the onset of pain as generally in gastric ulcer, or came on after the onset, as in ruptured ectopic gestation with haemorrhage); the leucocyte count, which is easily and quickly made, and which is often useful in confirming a suggested diagnosis.

(2) The Local Condition - whether and where the abdominal muscles are rigid, and where tenderness can be elicited by pressure - observations that indicate which organ is at fault and to what extent the peritoneum is involved. The importance in this connection of a Rectal or Vaginal examination must not be forgotten/

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forgotten - especially in the child, where almost the whole of the abdomen can be palpated by this method, and in the female, where the condition of the pelvic organs must be ascertained.

The cases detailed below illustrate and amplify many of the points which have been mentioned. Some of them indicate that in certain cases it is impossible to reach a true diagnosis until the abdomen is opened.

A. Four Cases of various lesions illustrating
difficulty in diagnosis.

Case 1. Ruptured Colloid Carcinoma of Caecum.

Mrs. Dow. aet. 72.

Admitted to Ward 8 - 19th January 1914.

Complaint. Pain in right side of abdomen.
Vomiting.

Duration. Three days.

History of the Acute illness.

16th January. In the evening patient was seized with sudden acute pain in the abdomen, referred to the region of the umbilicus. The pain was not excessive at first, but gradually got worse.

17th January. By this date the pain had settled in the right iliac fossa.

18th January. Patient took a dose of opening medicine.

19th January. (Day of admission to R.I.E.) She began to vomit in the morning, and vomiting persisted intermittently until her admission to hospital at night/

night. Her bowels moved twice - in response to the medicine taken the previous day.

History of Previous Health. Patient's health has always been good. She has often been troubled with a cough. There is no dyspeptic history.

Family History contained nothing of importance.

Physical Examination.

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|---------------------------|-------------|
| <u>General condition.</u> | Temp. 101°. |
| | Pulse 96. |
| | Resp'n 24. |

Patient exhibited only a moderate amount of collapse. Her tongue was very dry. She was still suffering a fair amount of pain. Leucocyte count was 11,000.

Local Condition. The abdomen, which showed a great deal of subcutaneous fat, did not move much on respiration, but was not by any means "boarded". There was a slight general resistance over the whole abdomen, with a marked localised resistance and tenderness over the right iliac fossa.

The diagnosis made from this history and examination was that of acute Appendicitis, the resistance and tenderness in the right iliac fossa suggesting a localised abscess. The history given was typical of this lesion, and the examination gave additional support. It was not until the abdomen was opened that the real state of matters was revealed.

Operation. 19th January. Mr. Caird.

Anaesthetic - CHCl₃.

A gridiron incision was made over the appendix region. When/

When the peritoneum was opened, free fluid escaped. There were seen also irregular masses of gelatinous colloid material, with a quantity of coagulated green lymph adherent to them. These lay free in the peritoneal cavity, and the source from which they came was recognised when the ileo-coecal region was felt to be thickened with what was evidently a neoplasm. Appearances and palpation together suggested a ruptured colloid carcinoma.

When this state of affairs was revealed, the original incision was enlarged backwards, in order to give better access. Adhesions which had formed round the bowel were broken, and the whole carcinomatous mass with the adjacent ileum and colon were drawn to the surface. The ileum was clamped and cut across, and its proximal end sutured by an "end-to-side" anastomosis into the ascending colon. The colon was then divided below the anastomosis, and the piece of bowel thus isolated, removed. The appendix was found in the resected mass. It had been torn across - whether by the manipulations of operation, or by the rupture of the carcinoma, was not certain. It was partly adherent to the caecum, and partly embedded in the colloid neoplasm. There were no signs of ordinary inflammation about it.

Superficial and deep drains of iodoform gauze were left in the wound, and the abdomen closed in the usual way with catgut and silk-worm gut.

Progress/

Progress.

20th January (next day) Patient showed no improvement, but gradually sank during the day. Her temperature which in the morning stood at 78.2° rose at night to 101° , while the respirations increased correspondingly from 26 to 34. She passed no flatus, and vomiting set in.

21st January. Patient died suddenly at 8.45 a.m.

The Sectio showed locally some peritonitis - due to a leak which had occurred at the ileo-colic anastomosis. A few of the stitches had given way owing to the rotten-
ness of the tissue through which they passed. *frailty*

Generally, the organs showed atrophic and fatty changes.

The chief interest in this case, and the reason for its inclusion in the present series, lies in this - that it illustrates a practical impossibility of a differential diagnosis. All the symptoms, both recounted by the patient herself and revealed by examination, exactly simulated those of ordinary appendicitis. It is true that the appendix was involved in the neoplasm, and the diagnosis made before operation was so far correct in that it located fairly accurately the site of the lesion. But it was not the appendix which gave rise to the symptoms.

There was nothing in the case to suggest carcinoma. The patient certainly was of an age when this condition is/

is common, but on the other hand, age is no bar to ordinary appendicular trouble. The reason why carcinoma was unsuspected is to be found in the fact that the symptoms were not due to the neoplasm itself (which must have been there for some time unnoticed) but to its rupture, and to the peritonitic pain which consequently ensued.

Case 2. Perforation of Gangrenous Gall Bladder.

Thos. Russel. aet. 62.

Admitted to Ward 7, 3rd November 1913.

Complaint. Pain in abdomen, and vomiting.

Duration. 30 Hours.

History of Acute Illness.

2nd November. At 10 a.m. patient was seized with sudden severe pain under the ribs on the right side. During the day this pain gradually got worse, and though it passed slowly downwards, it never became localised at a particular spot. Patient began to vomit bitter green material soon after the onset of pain. The vomiting persisted for about six hours and then ceased. The bowels had not moved for five days, in spite of medicine. Patient could remember no passage of flatus since the last motion, but was not very certain on this point. He had certainly passed no flatus for two days.

3rd November (day of admission). The pain had not lifted at all, but was still severe, especially when patient took a long breath or coughed.

History/

abated

History of Previous Health.

Patient's health had always been good save for a number of "bilious attacks" which he had been subject to as a younger man. He had been free of these for three years. He did not recollect ever being jaundiced.

Family History showed nothing of importance.

Physical Examination.

General Condition. Patient looked very unwell and collapsed. The tongue was dry.

Temp. 99.8°

Pulse 80

Respirations 28.

The leucocyte count was only 7600.

Local Condition. The abdomen, which was not distended, moved very little with the respirations. The parietal muscles were somewhat rigid all over, this rigidity amounting to actual boarding on the right side, both in the hypochondriac and lumbar regions. On palpation there was tenderness all over the abdomen, specially marked over the region of the gall-bladder, in the right iliac fossa, and suprapubically. Rectal examination gave no positive result. There were no signs of external herniae.

The diagnosis in this case was not a simple one. It was evident from the general rigidity and tenderness that some degree of diffuse peritonitis was present. As a cause of this, perforation of a duodenal ulcer was suggested by the location of the pain/

pain at its onset, viz., in the right hypochondrium - a suggestion which was not negatived by the absence of the typical dyspeptic history. Nevertheless in this case the nature of the pain also was not typical of duodenal ulcer. It was not of the excruciating variety that doubles up its unfortunate victim - it "gradually got worse". This combination of atypical history and atypical pain was thus almost sufficient to exclude the duodenal lesion from consideration. In addition there was no malaena.

The location of both the original pain and the subsequent tenderness below the costal margin on the right suggested that the Gall bladder might have undergone some inflammatory or necrotic change which had resulted in peritonitis. There were no symptoms which definitely contra-indicated this diagnosis, and it was in some degree backed up by the history of previous "bilious attacks", although there had been no jaundice.

Even in this case the possibility of Appendicitis could not be forgotten. All the trouble might have arisen from the inflammation and perforation of an appendix in the abnormal position it sometimes holds below the liver.

The symptoms of stoppage of the bowels which were present made one ask whether the case might not be one of simple obstruction, the peritonitis following as a result of necrotic changes in the intestinal wall at or near the site of the block. Yet, though it was difficult/

? What is
"simple"
obstruction?

difficult to account for the obstinate constipation, it had to be remembered that it was noticed before the onset of pain. Besides this, the peritonitis developed altogether too rapidly after the pain set in to allow of such an explanation of its causation.

Another possibility - that of the rarer condition of Acute Pancreatitis - was suggested by the general story of acute pain and vomiting, ^{especially} when considered along with the history of biliousness and the symptoms of obstruction. But this diagnosis was practically excluded at once by the very definite evidence of acute peritonitis, with muscular rigidity, because in pancreatitis the abdominal muscles are notably lax, save in advanced cases - and this present attack had lasted only thirty hours.

On the whole the evidence pointed most clearly to a necrotic condition of the gall bladder. It was with this diagnosis that the patient went to the operating theatre, and there the diagnosis was confirmed.

Operation. 3rd November, 1913. Mr. Caird.

Anaesthetic, CHCl_3 .

A mid-line incision was made from the umbilicus, upwards for about six inches. Whenever the peritoneum was opened, free bile stained fluid was seen. Attention was therefore at once directed to the gall bladder, which, when brought into view, appeared enlarged and gangrenous, and adherent to the liver. After the adhesions/

adhesions had been divided, the neck of the gall-bladder was clamped and divided. Thus the necrotic fundus was removed. The stump was ligatured, and covered with peritoneum by the aid of a silk stitch.

A supra-pubic drain was inserted, and the abdomen washed out. The mid-line incision was then closed with through-and-through silk-worm-gut stitches, and the skin edges stitched with horse-hair.

Progress.

4th November. The condition of the patient gave rise to considerable anxiety. He had passed no flatus since the operation, and in the morning was vomiting dark foul-smelling material. In view of this the supra-pubic drain was withdrawn, the stomach was washed out, and a flatus enema administered. In the evening vomiting still persisted, and the pulse rose to 150 and was irregular. A hypodermic injection of strychnine, and salines with brandy by the rectum were given.

5th November. Patient was much improved. The vomiting ceased; he passed flatus for the first time and the pulse rate fell to 80.

Thereafter the progress of the patient was good and uneventful. He was discharged on 26th November.

Case 3.Acute Pancreatitis.

Mrs. E. Brown. aet. 64.

Admitted to Ward 8, 10th February 1914.

Complaint. "Stoppage of the Bowels" - abdominal pain and vomiting.

Duration. 30 Hours.

History of Acute Illness.

9th February. In the morning patient passed a small motion - she could not remember whether flatus passed at this time or not. Very soon after she was seized with a sudden severe attack of colicky pain, which assumed an intermittent character, increasing and decreasing in intensity every few minutes. At 10 a.m. she began to vomit a dark material. Vomiting persisted throughout the day and the following night.

10th February. Vomiting was still present. Patient was treated with an enema, but with no relief. She was sent in the afternoon to R.I.E. She had passed no flatus since the morning of the 9th.

History of Previous Health.

Patient's health had always been good until 4 years ago, when she had an attack similar to this one, but which yielded to enemata. 6 months ago she began to have pain, in the right side of the abdomen, which was worse at night than during the day. At this time she became much more constipated/

constipated than she had been accustomed to be, and was forced to take medicine three or four times a week to keep the bowels open.

Family History showed nothing of consequence.

Physical Examination.

General Condition. Patient was a very stout woman. The tongue was dry. Temp. 98.8°
Pulse 80
Respirations 32.
The leucocyte count was 10,000.

Local Condition. The abdomen, which was very fat, moved fairly freely with respiration. The parietal muscles showed no rigidity. Gentle palpation elicited no tenderness: no peristalsis was evoked, nor was any splashing noticed. Deeper palpation discovered some tenderness in both iliac fossae, particularly the right, also suprapubically, and in the region of the gall-bladder.

Rectal examination revealed a little discomfort and tenderness in the Pouch of Douglas.

The liver dulness was a little diminished.

There was no evidence of herniae at the rings.

On admission an enema was administered - no flatus was liberated. Patient was kept under observation and in four hours another enema was given. Neither faeces nor flatus came away, only a little clear mucus. The rectum held only 18 ounces of fluid.

The diagnosis in this case was even more difficult than in the last. The first point noted was that there/

there was no peritonitis - proved by the absence of tenderness and rigidity of the abdominal parietes. This fact excluded at once any lesion of the nature of a visceral perforation - whether from ulcer, or appendix, or gall bladder.

The possibility, however, of an inflammatory visceral condition which had not advanced far enough to perforate had still to be considered. Tenderness on deep palpation in the right iliac fossa, pointed to the appendix. But, on the other hand, there was no rigidity of the muscles over that region; the nature of the pain at its onset - an intermittent colicky pain - was not typical of appendicitis, and the pulse, temperature, and leucocytosis were lower than one expects in a lesion of this nature.

The lax character of the abdominal wall suggested the possibility of Acute Pancreatitis. The relatively low pulse and temperature, along with the obstinate vomiting fell in with this suggestion, and the fact of distension was capable of explanation on this diagnosis. Yet there were other symptoms and signs which discredited this view - the pain was intermittent and resembled colic, a different story from that which is usual in pancreatitis; the abdomen was not much distended, as it should be in pancreatitis from paralytic distension of the intestines; there was no jaundice, nor any history of this trouble; and finally, while pancreatitis usually occurs in the male, patient was of/

of the other sex.

There was more positive evidence in this case in favour of primary stoppage of the bowel than in favour of any other condition. The symptoms of obstruction were unmistakable - non-passage of flatus and faeces, and continued vomiting. The laxity of the abdomen, the absence of leucocytosis and fever, and the colicky pain, were consistent with this diagnosis. On the other hand, however, no peristalsis was observed making the characteristic ladder patterns, although these might have been present and unobserved through the thick fat of the abdominal wall. The diminished liver dulness, indicating distension of the colon, and the fact that the rectum only held 18 oz. of fluid pointed to a stricture of the lower colon - probably of a cancerous nature considering the age of the patient (64).

Thus the case was seen not to be typical of any single condition but to simulate in some respects a variety of abdominal lesions. The bulk of the evidence, however, pointed to a malignant stricture of the colon, suddenly become acute, and the operation was first planned for the relief of this.

Operation. 10th February 1914. Mr. Caird.

Anaesthetic. An area of abdominal wall in the left flank was infiltrated, layer by layer, with $\frac{1}{2}\%$ novocaine, injected with a hypodermic needle.

An/

An oblique incision was made as for a colostomy. When the peritoneum was opened, small intestine presented which was only moderately distended. The Colon was palpated and found empty - thus disposing of the obstruction diagnosis at once. The true nature of the condition was recognised when the omentum was brought into view, dotted over, as it was, with white spots of fat necrosis - unassailable evidence of pancreatitis. On examining, the extraperitoneal fat which had been incised was found in a similar condition. In order to reach the seat of the trouble in the pancreas, the original wound was packed with gauze and CHCl_3 administered.

A mid-line incision was then made. Here omentum and distended transverse colon presented. Fat necrosis was evident on these, and also on the gastro-hepatic omentum. The gall bladder was found to be very tense and deeply placed. The pancreas appeared firm, hard and friable. The peritoneum covering it was torn with the finger, and a glass drainage tube inserted. The gall-bladder was not drained.

The mid line incision was closed with through-and-through silk-worm-gut sutures, and a row of horse-hair stitches. A glass drain was inserted into the flank wound also, which was closed in the same way.

Progress.

11th February (next day). Patient passed flatus, and was fairly well. The tubes were removed four or five/

five days after the operation, and progress was excellent until

23rd February, when patient began to vomit blood.

This happened occasionally for a week. There was no obstruction during this period, for flatus was passed freely.

1st March. Albumin and casts appeared in urine.

2nd March. Patient died.

The Section showed that the condition of Acute Haemorrhagic Pancreatitis had advanced to a considerable degree. There was an extensive necrotic change of the pancreatic tissue itself, and a lot of fat necrosis in the abdomen.

There were toxic changes in other organs, especially in the kidneys.

The gall bladder was found to be distended and contained stones.

Case 4. Ruptured Ectopic Gestation.

Mary Mackintosh. aet. 32.

Admitted to Ward 8, 6th October 1913.

Complaint. Pain in abdomen: vomiting.

Duration. 12 hours.

History of Acute Illness.

5th October. Patient felt generally unwell all day.

At 8.30 p.m., after a light supper, she was seized with severe pain in the abdomen as a result of which/

which she almost fainted. She vomited two or three times. During the night, while the pain continued, the bowels acted once. She had passed no water since the onset of pain.

History of Previous Health. Patient had always enjoyed good health. She had never suffered from anaemia. Menstruation had always been regular until lately. She had missed the last two periods.

Family History contained nothing of importance.

Physical Examination.

| | |
|---------------------------|------------------|
| <u>General Condition.</u> | Temp. 98° |
| | Pulse 164 |
| | Respirations 44. |

Patient was well-nourished, but very anaemic and collapsed. The tongue was dry. Leucocyte count was 24,000.

Local condition. Abdomen - movement of parietes restricted, especially above the umbilicus. On palpation the muscles were found to be a little rigid all over, but only markedly so at the upper part of the right rectus. There was tenderness in this region, as also in the right iliac fossa, where however the muscles were not rigid. There was no tenderness in the loins. Percussion showed that the liver dulness was normal in extent; no free fluid was perceptible in the abdomen, although there was some dulness above the pubis. A catheter was passed but no water could be drawn off.

By a vaginal examination the cervix was discovered to/

to be a little lower than usual. There was some fulness and tenderness in the Pouch of Douglas. A leucorrhoeal discharge, without blood, was present.

The diagnosis in this case lay between gastric or duodenal ulcer, appendicitis, and some pelvic condition, as rupture of a pyosalpinx, tubal gestation, or ovarian cyst.

The lack of generalised tenderness and rigidity indicated almost certainly that there was no infective peritonitis present, although the site of maximum rigidity and tenderness, over the upper right rectus, strongly suggested Perforation of a Gastric or Duodenal Ulcer. Against the possibility of this being gastric stood the facts that there was no dyspeptic history and no acute peritonitis, and that the extreme anaemia had come on after the pain began. Against a duodenal lesion were the age and sex of the patient, the absence of diffuse peritonitis, and of the typical malpena. a/

Ordinary Appendicitis, whether perforated or not, was excluded by the distinct absence of rigidity over the right iliac fossa. A lesion of the appendix in its abnormal position beside the gall bladder was more likely, but was not sufficient, especially in face of the pelvic symptoms, to explain the whole mischief.

The history of amenorrhoea, combined with the results of vaginal examination, indicated with almost complete certainty that some lesion in the pelvic organs had occurred. The excessive anaemia showed that/

that the lesion had been accompanied by considerable internal haemorrhage. It was unlikely that a pyo-salpinx should have given rise to this condition; nor was there any indication of swollen tubes to the examining fingers. Physical examination had revealed no tumour or swelling suggestive of an ovarian cyst, while both the history and the examination had demonstrated the possibility, if not the probability, of an ectopic gestation.

Operation. 6th October, 11.30 a.m. Mr. Caird.

Anaesthetic, CHCl_3 .

A mid-line incision about five inches long with the umbilicus at its centre, was made. When the peritoneum was opened, blood stained omentum presented. Free blood was discovered low down in the peritoneal cavity, and the incision consequently prolonged towards the pubis.. The blood clots were turned out, and the pelvic organs examined. The right tube was seen to be swollen locally close to the uterus. In the middle of this swollen part a rupture was evident. There was no active haemorrhage from the ruptured wall.

The tube was amputated, and the stump covered with a layer of peritoneum from the Broad Ligament.

The abdomen was closed with through-and-through sutures of silk-worm-gut, and with a row of horse-hair stitches.

A two-months embryo was found in the blood clot which had been turned out from the abdomen.

During/

During the operation the radial pulse became imperceptible and patient was transfused with $1\frac{1}{2}$ pints of Saline on the table.

Progress.

6th October (same day).

6 p.m. Patient was extremely weak from loss of blood. Air hunger was a prominent symptom. A hypodermic of $\frac{1}{40}$ gr. strychnine was given, and the breasts were infused with saline and adrenalin. Other means, such as tilting the foot of the bed, and bandaging the lower limbs, were adopted to conserve the virtue of the remaining blood. A little improvement resulted, which was only temporary, however, and at

10.30 p.m. patient died with symptoms of air hunger.

At the Sectio it was found that all the organs were very pale and anaemic; death had evidently been due to haemorrhage and shock.

B. Five Cases of Acute Mechanical "Stoppage of
the Bowel."

Tuberculosis

Case 5. Acute obstruction by adhesions of T.B.
peritonitis.

Jane Lillie. aet. $8\frac{1}{2}$.

Admitted to Ward 8, 9th January 1914.

Complaint. Pain in Abdomen, Vomiting.

Duration. Three days.

History of Acute Illness.

6th January. Patient had an attack of diarrhoea in the morning, but went to school as usual. In the afternoon she came home crying with abdominal pain. Vomiting set in very soon and continued intermittently day and night till her admission to hospital.

8th January. Patient had twice some difficulty in micturition.

9th January. Admitted to Ward 8. Patient had passed no flatus nor motion since the onset of pain three days before.

History of Previous Health.

Up till three months ago patient had good health save for attacks of measles and whooping cough. During the last three months she had been generally unwell, was easily tired, had no appetite, lost weight and got very pale. She also had attacks of diarrhoea which lasted for two days each week.

Family/

Family History. Father died of brain-fever (T.B.?). Mother alive and well. There are two children in the family older than patient, and three younger: all are healthy.

Home conditions. Patient was accustomed to sleep in a room with three others. The windows were always kept shut.

Physical Examination.

General Condition. Patient, who was pale and weakly, appeared very ill and collapsed. The tongue was dry and the eyes sunken. Temp. 101°
Pulse 138
Respirations 24
Leucocyte count was 14,600.

Local Condition. The abdomen, which moved with respirations, was very much distended. There was no rigidity of the parietes. Distinct peristalsis and ladder patterns were visible, especially towards the left side. On percussion the abdomen was found to be resonant all over, and no free fluid could be detected. Palpation discovered no lump or localised resistance; some little tenderness was found in the left iliac fossa.

The diagnosis of acute obstruction was in this case easily made from the typical history and the typical appearance of ladder patterns on the abdomen. The only point that presented any difficulty was to determine the cause of the obstruction. The clue was given here by the protuberant condition of the abdomen. This/

This might have been due, and no doubt was^{due,} partly at least, to the distention by gas of the blocked intestine. On the other hand a swollen abdomen in a child suggests to one's mind other conditions such as T.B. peritonitis, Hirschsprung's disease, and the pot-belly of rickets.

The rickety condition may be passed over (noting only that it sometimes appears to be a predisposing cause to T.B. peritonitis) because there were no other signs of rickets in the child.

Hirschsprung's disease, apart from the fact that it is congenital and would have been noticed before, would have given rise to a history of constipation rather than of diarrhoea.

T.B. Peritonitis was a much more likely diagnosis, especially in view of the three months illness which had preceded the acute attack, and during which the child had grown pale and weakly and thin. The adhesions which form in this condition were also ample warrant for an acute obstruction to develop. And a possible hint of T.B. in the family is got in the statement that the child's father died of a "brain-fever" which might easily have been a tuberculous meningitis.

The condition was diagnosed from Volvulus by the fact that there was no localised swelling or tenderness; and from Intussusception by the facts that the pain was not intermittently paroxysmal in character, and that/

that there was none of the characteristic discharge of blood and mucus from the rectum.

Operation. 9th January 1914. Mr. Caird.

Anaesthetic. CHCl₃.

A mid-line incision was made upwards from the umbilicus. When the peritoneum was opened generalised T.B. peritonitis of the dry variety was seen to be present. A loop of collapsed small intestine was found towards the right side, and when this was followed upwards it led to a point where the intestine was bound by adhesions to the posterior abdominal wall, so tightly as to cause a complete block. A loop of the distended bowel above the obstruction was anastomosed laterally to the transverse colon. The abdomen was closed in layers in the usual way.

Progress. There is none to record, for patient died at 2.30 a.m. the next morning.

There was no Sectio.

Case 6. Gall Stone Ileus.

Mrs. J. Stalker. aet. 54.

Admitted to Ward 8, 26th January 1914.

Complaint. Stoppage of the bowels. Abdominal pain, and vomiting.

Duration Four days.

History of Acute Illness.

22nd January. Having been troubled with diarrhoea for three/

three days, patient on this date took a dose of castor oil. Her bowels did not move in response to this medicine. From this time until her admission to hospital they did not move, nor did she pass any flatus. In the evening of the 22nd, she began to vomit. The vomiting continued intermittently until admission, the material brought up was foul smelling.

23rd January. She was suffering enough pain of a distinct colicky nature to call for a hypodermic of morphia from her doctor.

25th January. Three enemata were administered, but with no result.

26th January. Another enema given in the morning with no effect. Admitted later in the day to Ward 8.

History of Previous Health.

For many years patient had suffered from bilious attacks. She used to vomit green material and experience abdominal pain when the biliousness was at its worst.

Two years ago she was definitely jaundiced.

During the last three months she had not been in the best of health. The biliousness had returned as it was before: one month ago she had had a turn of vomiting during a bilious attack.

Family History, contained no facts of any importance.

Physical/

Physical Examination.

General Condition. Patient was not emaciated and showed only a moderate degree of collapse. Tongue was dry.

Temp. 98°
Pulse 100
Respirations 24.

Local Condition. The abdomen moved freely with respiration, and was rather distended. There was no peristalsis or ladder patterns visible. Palpation showed no rigidity of the abdominal wall, and no tumour or resistance in the interior. On percussion the abdomen was resonant all over, the resonance being marked over the descending colon. A rectal examination revealed nothing abnormal in the Pouch of Douglas.

Diagnosis. The features presented here remind one of the condition of Acute Pancreatitis discussed above in Case 3. The points of resemblance in the two cases are the laxity and free movement of the abdominal wall, the absence of any sign of ladder patterns and the ineffectual treatment by repeated enemata. But against these resemblances one must place the very important difference that this attack was not ushered in by the onset of acute pain, as it always is in Pancreatitis. Here the symptoms of stoppage and vomiting preceded the pain by at least twelve hours. Another reason for the obstruction had therefore to be sought for.

While the absence of ladder patterns and the early onset of the vomiting suggested that the site of the/

the block was in the small intestine, the tympanitic note over the descending colon and the history of three days' diarrhoea pointed rather to the pelvic colon as the site and to carcinoma as the cause of the mischief. Against that had to be placed the considerations that stricture in the pelvic colon causes acute distension in the caecum, rather than in the descending colon: and that the tympanitic note might have been due to overlying small intestine. There were no general symptoms which favoured a diagnosis of cancer. The patient was not emaciated, gave no history of loss of weight, and had not the appearance of one suffering from this condition.

The history of previous health recounted by the patient was in this case extremely suggestive and of great diagnostic value. She gave a very definite history of biliary disorder extending over many years. Jaundice two years before indicated almost certainly that gall stones had been formed. The trouble had begun afresh within the last three months so that it appeared very probable that the obstruction might be due to the impaction of a large gall stone which had ulcerated into the small intestine. It is true that there was no definite attack of pain in the history to which one could point and say that it was evidence of the process of ulceration. But this might find its explanation in the fact that abdominal pain had been for/

for years a usual thing in the patient's life, and was therefore little emphasised by her in the history she gave. It is also conceivable that the ulceration was so encased with omental or other adhesions that it gave rise to no local peritonitis what-ever, and so to no exceptional pain at all.

The diagnosis of gall stone ileus was confirmed when the abdomen was opened.

Operation. 26th January 1914. Mr. George Chiene.

Anaesthetic, CHCl_3 .

The incision was transverse, above the umbilicus, about six inches long, the right rectus muscle being divided. When the peritoneum was opened, a small amount of clear free fluid was found within. The gall bladder was first palpated and discovered to contain stones. The small intestine showed several dilated loops, while the large bowel was empty. The obstruction being thus evidently in the small gut, the jejunum was examined and a hard impacted mass found in its lumen, about fifteen inches from its commencement.

A longitudinal incision was made in the bowel at this point and a large gall stone removed. The stone was dome-shaped, with a single flat facet opposite the apex of the dome. The incision was then stitched in the long axis of the gut.

As the gall bladder was deeply placed and difficult to reach, it was left alone, the intention being to remove/

remove the stones it contained at a later date.

The abdomen was closed in layers with catgut and horse-hair, a superficial rubber drain being inserted into the fatty tissue of the abdominal wall.

Progress was excellent from the start. In the evening of the day of operation a flatus enema was administered, which liberated both flatus and a large motion. Patient had no vomiting after the operation. She was discharged after three weeks in hospital.

The record of this case would not be complete without an account of the second operation which was done two months after the first, and which revealed an interesting condition of the gall bladder.

Second operation. March 28th, 1914. Mr. George Chiene.

Anaesthetic, CHCl_3 and Ether.

A transverse incision was made parallel to and about one inch above the old scar. The right rectus was again divided. The gall bladder was found to be hidden by omental adhesions. When these were divided it was evident that the gall bladder was small and thickened, and adherent to the duodenum. When it was opened, a large gall stone was removed, exactly similar in shape to that which had been found in the intestine at the previous operation. The interior of the gall bladder was then explored. It was found to have no communication with the duodenum, and the cystic duct was also closed. The gall bladder was drained and the abdomen closed in the usual way.

The/

ly
n

The condition of the gall bladder thus revealed is extremely interesting, illustrating the remarkable power the body has of adapting itself to pathological conditions in order to bring about a spontaneous cure. Here, to get rid of an irritating gall stone, a road had been forced into the duodenum, and the door, as it were, closed again behind it, so that things were left as near normal as possible. Had it not been that the gall stone was unfortunate enough to stick in its passage through the intestine, nature's cure would have been perfect, and the aid of the surgeon uncalled for.

One would not have expected this condition, because a fistulous communication between two viscera lined by mucous membrane tends to remain patent. A gastro-enterostomy would be of little avail if this were not so. There is a possibility that the gall bladder may have been loculated, and that the first stone had ulcerated from one compartment into the duodenum, its path remaining unclosed, while the second stone was discovered in the other compartment. But the correspondence in shape between the two stones, and the single facet on each, indicates that at one time they lay in apposition in the same chamber.

The explanation of the closure most probably lies in the possibility that the mucosa of the gall-bladder and the mucosa of the duodenum did not meet and line the fistulous track. The path along which the stone passed/

passed was more likely sinus-like in character, lined by raw granulations which came together and fused, when the foreign body had passed into the bowel.

Case 7. Volvulus of the Caecum.

Wm. Birrell. aet. 34.

Admitted to Ward 7, 23rd March 1914.

Complaint. Pain in right side of abdomen,
 Vomiting.

Duration. 22 hours.

History of Acute Illness.

22nd March. At 2 p.m. when patient was at a funeral he began to experience pain in the abdomen, referred to the umbilical region. The onset of pain was not sudden. It gradually increased in intensity, shifting after six and seven hours to the right side, and being worst at night. During the night he did not sleep, and vomited six times. The pain abated towards morning.

23rd March. He was sent in the forenoon to the R.I.E. The bowels, which had always been regular, had not moved since 20th March. He had passed no flatus since the pain began.

Previous Health, had always been excellent.

Physical Examination.

General Condition. Temp. normal
 Pulse 80
 Respirations 24.

Patient had a good colour, and though a little anxious did not appear very unwell. The tongue was dry.

Leucocyte/



Leucocyte count - 18,400.

Local Condition. The abdomen did not move freely on respiration - the muscles were held a little stiff all over, and especially rigid at the right side. A swelling was visible to the right of the middle line below the umbilicus. On palpation the right rectus was found contracted, especially in its lower half. This area of rigidity corresponded with an area of tenderness - the point of maximum tenderness being just below and a little to the right of the umbilicus. The swelling in the right iliac fossa, noticed on inspection, was found to be distinctly resistant and tender. On percussion the swelling was dull. In size it was as big as a child's head.

Patient had a small inguinal hernia on the right side. It was not strangulated, but could easily be put back. It had existed for two years and had given no trouble.

Rectal examination revealed some slight tenderness in the Pouch of Douglas, in the middle line.

Patient passed water after admission. The swelling in the abdomen did not diminish in size.

Diagnosis. The question which at once suggested itself in this case was - "Is this appendicitis, and if not, what may it be?" In certain points it resembled an ordinary appendix lesion, the pain was referred first to the umbilicus and shifted later to the right iliac fossa; and there was definite localised tenderness/

tenderness and rigidity in that region. The points of difference, however, were more remarkable. Although the leucocytosis had risen to 18000, the pulse, temperature and respirations were all unaffected and normal; the pain was not sudden in onset; there was a history of stoppage of the bowel; and finally there was this resistant dull swelling in the abdomen.

It was possible that a peri-appendicular abscess, localised by adhesions, might have given rise to a swelling such as was seen in this patient. But it was certain that it could not have done so without affecting considerably the general health, and would have been associated with a high temperature or a quickened pulse.

The possibility of the swelling being a distended bladder was not forgotten. Yet this was unlikely, because patient gave no history of urinary trouble and could pass water freely. In addition, passage of water caused no diminution in the size of the swelling.

While in the female this swelling might have been taken for an ovarian tumour, in the male one was almost forced to the conclusion that it was due to a localised distention of the bowel. The history of stoppage and vomiting indicated that obstruction might be the cause of the distension, while the localisation of the trouble in the region of the caecum, and the defined nature of the swelling suggested strongly that one was here dealing with a case of Volvulus Caeci. One expected, however, /

however, in this condition to meet with a resonant swelling, and there was dulness in this case. It might have been that there had occurred little gas formation, the condition having lasted only a comparatively short time; or (as was proved at the operation) that blocking had been complete only at the distal end of the twisted loop. So that the contents of the small intestine were still able to pass into and distend the caecum.

While the last case (of Gall Stone Ileus) illustrates the importance in diagnosis of the history supplied by the patient, the present case seems to show how necessary it is to supplement and correct the impression conveyed by the history, by a careful physical examination, both local and general.

Operation. 23rd March 1914. Mr. George Chiene.

Anaesthetic, CHCl_3 . Under the anaesthetic the swelling in the lower abdomen appeared to become more pronounced (due doubtless to the relaxation of the parietal muscles) and to shift more towards the middle line. It looked thus more like a distended bladder than before. A catheter was passed but no urine came away.

Incision. Mr. Chiene's own appendix incision, prolonged outwards a little way, and inwards to the middle line, dividing the right rectus transversely. When the peritoneal cavity was opened the swelling was seen to be due to dilatation of the caecum, which was rotated/

rotated from right to left through an angle of about 120° , the peritoneum on its (original) lateral aspect being stretched and torn. The ascending colon was occluded a little way up by a well marked, tense, Jackson's membrane. When this was divided and the twist on the bowel undone, it was possible to empty the caecum by compression.

The appendix was freed by division of its mesentery and brought out on to the skin surface by a separate opening, with three objects in view:- (1) in order that an appendicostomy might be done at any moment if the necessity should arise to drain the caecum of stagnating or putrefactive contents; (2) to make it possible to inject some stimulating drug should paresis of the bowel develop; and (3) to anchor the caecum securely and so prevent a recurrence of the volvulus. The abdomen was then closed in layers in the usual way.

The etiology of this volvulus, in view of the presence of ^{the} Jackson's membrane is interesting. It is possible that the constriction of the caecum by the membrane gave an opportunity for overloading and consequent volvulus of the caecum, and that it was put more and more on the stretch as the distension developed, and so accentuated the obstruction of the gut. The opinion expressed by the operator, however, was that the volvulus was the primary lesion and that the membrane which had existed previously without symptoms was/

was only brought into prominence and stretched when the distension of the caecum put strain on the wall of the colon.

Progress.

24th March (next day). Patient was fairly well. He had passed flatus, and there had been no return of vomiting.

25th March. When the wound was dressed, the appendix was removed, the necessity for it having passed. Patient passed a good motion.

5th April. Patient threatened to have some pulmonary trouble. His temperature rose, and some dulness was found at the base of the right lung. This passed off, however, and by

12th April, he was well enough to be discharged.

Case 8. Acute Intussusception.

Edward Paton. aet. 9 months.

Admitted to ward 7, 19th January 1914.

Complaint. Sudden screaming at intervals.
Vomiting.

Duration. 36 hours.

History of Acute Illness.

17th January. Patient commenced at night to vomit a yellow material. The bowels had moved at 11 a.m. that day.

18th January. Vomiting had continued at intervals. At 3 p.m. the child began suddenly to scream, and had/

had fits of screaming every ten or fifteen minutes. This distressing condition continued until admission to hospital next morning. Powders and poultices given by the doctor gave no relief. At 10 p.m. in response to a glycerine suppository some blood and slime, without faeces, was passed by the rectum. 19th January. Patient was brought to R.I.E.

History of Previous Health.

The child had been fairly healthy from birth. The bowels had always been regular, save for two attacks of diarrhoea when he was aged 3 and 6 months respectively.

In October 1913, aged 5 months, patient had an attack similar to the present one; screaming with vomiting lasted for one day only. There was some blood passed by the rectum at this time also. Patient was breast-fed and had not been weaned.

Physical Examination.

General Condition.

Temp. 100°
Pulse 170
Respirations 32.

The child looked very pale and ill. The tongue was dry, and vomiting still continued.

Local Condition. The abdomen was rather distended, but not rigid. There was no evident swelling or peristalsis. Palpation was carried out under chloroform, both from the surface and per rectum, but no tumour could be felt in any position.

Diagnosis/

Diagnosis. In a child so young, where one cannot get from the patient himself information regarding the severity, or the site, or the mode of onset of the pain, one has to rely mainly on three things in forming a diagnosis:- (1) the child's involuntary description of the severity and nature of the trouble - its crying or screaming, the position of its body, its vomiting and motions, etc.; (2) the physical examination of the child; and (3) the history of the illness as supplied by the patient's mother. These three sources of information are all important, though in this case only the third was of any assistance. It was not difficult, however, to make the diagnosis of Acute Intussusception from the history supplied. The chief typical clinical facts were present - paroxysms of screaming, the vomiting of obstruction, and the passage of blood and mucus from the inflamed apex of the invaginated gut. It was quickly differentiated from simple colic, for this condition does not give rise to obstruction, and therefore to vomiting, nor does it lead to the passage of blood and mucus alone by the rectum. It was notable in this case, that though the history was so clear, yet the typical "sausage-shaped swelling" of the writers was not palpated even under an anaesthetic. Its absence made one wonder if the intussusception, which certainly had existed, were still present at the time of examination, and if an operation were after all necessary. Nevertheless, the facts that there/

there had been a previous attack, suggesting that there must be a definite exciting cause for the mischief, and that vomiting still continued, turned the scale in favour of immediate interference.

Operation. 19th January 1914. Mr. Caird.

Anaesthetic, CHCl_3 and Ether.

(a) A short mid-line incision was made below the umbilicus. When the ileo-caecal portion of the bowel was brought out, it was seen that no intussusception was present, but the congested and inflamed appearance of the part suggested that the lower ileum had recently been invaginated into the caecum. On palpation a soft mass, not faecal matter, was noticed in the caecum. Its feel suggested a polypus. The caecum was opened transversely and the soft mass proved to be due to a redundancy of the mucus membrane of the ileo-caecal valve. Whether this had been a congenital abnormality, or a relic of the last attack, could not be determined, but it was evidently the exciting cause of the trouble. It was therefore felt wise to remove the caecum. A lateral anastomosis was made between the ileum and ascending colon, and the intervening portion of gut - containing the caecum, appendix, and valve, was resected. The cut ends of the bowel were ligatured with catgut, and their stumps invaginated with silk stitches. The abdomen was then closed with through-and-through silkworm gut and horse-hair.

Progress.

20th January (next day). The child was fed from the breast/

breast once, and passed a large amount of flatus. No faeces, however, came away, and vomiting of black material set in.

21st January. The child made no headway, and refused the breast. Again there was passage of flatus without faeces and the black vomit persisted. He grew gradually weaker and died at mid-night.

The Sectio showed a little pocket of localised peritonitis behind the ileo-colic anastomosis. There was, however, no leak from the line of suture. The cause of death was seen to be a partial obstruction of the small intestine, a coil of ileum having become attached by recent adhesions to the transverse colon, thus causing a twist of the mesentery.

Case 9. Chronic Malignant Stricture turned Acute.

R. Saunders. aet. 63.

Admitted to Ward 7, 29th December 1913.

Re-admitted - 30th January, 1914.

History of Chronic Trouble for which he was treated first in December 1913.

Patient had for some years suffered from an enlarged prostate. In November 1913, when this condition became associated with pain on micturition, he took to bed. Thereafter he began to experience pain and uneasiness in the abdomen, got gradually more and more constipated, and had repeatedly to take opening medicine. His appetite began to fail and he got thinner.

On December 29th he was admitted suffering from subacute/

subacute obstruction. The abdomen was distended, colicky pains were present, and no flatus had been passed for twenty-four hours. There had been no vomiting.

Previous Health had always been good.

Family History, as stated by the patient, revealed nothing save that he was one of a family of six, two of whom, a brother and a sister, had died.

Physical Examination.

General Condition.

Temp. 98°
Pulse 96
Respirations 24.

Local Condition. The abdomen was distended,

but inspection showed no defined swelling or ladder patterns. There was no splashing on palpation, nor could any resistant mass be felt.

Rectal examination. - A hardness was uncertainly felt by the finger tip beyond the enlarged prostate which, although it was indefinite, suggested a carcinoma in this patient, aged 63. To make more certain the sigmoidoscope was inserted about seven inches, but yielded no information of abnormality.

Treatment.

By frequent enemata the constipation was overcome and patient improved considerably. He was discharged on January 5th, feeling much easier. His symptoms of obstruction had been treated successfully, but the cause of the trouble, of which no definite trace had been found was still untouched and still operative.

That/

That this was so was proved beyond a doubt by the further history of the patient. He was readmitted to Ward 7 on 30th January 1914, suffering from acute obstruction which was very severe.

History of second attack, which became acute.

On 18th January - 17 days before admission - the abdomen began to get distended, and patient vomited once. A week later, the distension, which had got gradually worse, began to affect his breathing. Enemata given at this time liberated faeces, but gave no relief from the distension. About this time too patient had another attack of vomiting, and again a third attack on 27th January. The vomiting was associated with absence of sickness or retching, and the material brought up varied in colour from green to dark brown.

After this the distension, vomiting, and respiratory trouble became so severe that he was hurried to hospital for treatment on 30th January.

Physical Examination.

General Condition. Patient, who was emaciated, looked very ill and weak. The eyes were sunken and the tongue dry. Respiratory embarrassment was very marked, and he had to be propped up in bed to get breath.

Temp. 96.4°

Pulse 118

Respirations 44

Leucocyte count - 16,000.

Local/

Local Condition. The abdomen was extremely swollen and tense, and did not move with respiration. Palpation could discover nothing because of the tension of the abdominal wall. On Percussion a resonant note was heard all over: the liver dulness was decreased. There was some splashing in the regions of caecum, ascending and transverse colon.

Rectal examination showed nothing abnormal. An enema, administered on admission, brought away some faeces and mucus, but no flatus. The bowel held about 10 ounces.

Family History. Two additional and very significant facts were discovered, viz., that his sister who had died, suffered from carcinoma of the uterus, and that his brother who had died, fell a victim to carcinoma of the bowel.

Diagnosis. It was evident that the patient suffered from acute obstruction. That carcinoma was the cause of this was by no means definitely proved. Nevertheless it was suggested by many things, e.g. the general look of patient, the history of chronic trouble, and the family history concealed by the patient until the very last. To locate the site of stricture was not easy, for while the splashing in the ascending and transverse colon suggested the sigmoid flexure on the side, the fact that the rectum held only 10 oz. of injection pointed to a constriction lower down. And there was nothing to prove that there might not be two/
two/

two strictures, to account for both these facts.

In this case, however, apart from the practical impossibility of making a complete and accurate diagnosis, one was not greatly concerned if this were not made. The immediate treatment - to relieve the distended bowel - had to be carried out whatever the cause. An operation was therefore devised to meet this necessity.

Operation. 30th January 1914. Mr. Caird.

Anaesthetic. Local infiltration anaesthesia with $\frac{1}{2}\%$ novocaine over an area in right iliac region.

An incision was made through the infiltrated abdominal wall, between the umbilicus and the right anterior iliac spine. When the peritoneum was opened a quantity of free fluid escaped - indicative either of general visceral congestion or, what was more probable, of general carcinoma of the peritoneum. When this fluid had drained away, the distension of the abdomen subsided a little, and one could make out by inspection that the regions of the caecum, ascending colon and stomach were specially swollen.

It was not possible to determine whether the portion of bowel which presented at the incision were small intestine or caecum, so distended was it. It was felt unwise to enlarge the wound in order to determine this, on account of the danger which would thus have been incurred of a rapid and complete evisceration, which might have had most serious consequences/

consequences. The incised parietal peritoneum was therefore stitched to the visceral layer on the gut, and when the row of sutures had been covered in with sterile vaseline and iodoform, a trocar and cannula were introduced with a vigorous stab into the lumen of the bowel. After the trocar was removed, a great amount of gas, and about 20 ounces of faecal fluid escaped, and so the distension of the abdomen was reduced. The cannula was stitched in position, and the wound dressed with iodoform gauze.

Patient was much relieved after the operation. His respirations were much easier, and his pulse, which stood before at 136, fell to 106.

Progress.

February 2nd. The cannula, through which faecal fluid and gas continued to escape, was replaced by a rubber tube of wider calibre.

February 4th. As his respiration rate had increased, the pleural cavities were examined, and fluid diagnosed in both. 42 ounces of clear fluid was aspirated from the left side.

February 6th. The right chest was aspirated, and 53 ounces of a similar fluid obtained.

There was by this time no doubt as to the diagnosis of cancer. Besides the evidence that the pleural condition gave of a malignant spread through the diaphragm, in the abdomen itself a large hard mass began to make its appearance below the umbilicus.

This/

This increased very rapidly in size. In a fortnight it reached almost as high as the ensiform cartilage, and a week later seemed to fill up the whole of the abdomen. It was then only a question of time until the end. Vomiting set in, with severe pain, which called for repeated injections of heroin. Patient gradually sank and died on 4th March.

The Sectio demonstrated the presence of tumour nodules all over the peritoneal and pleural surfaces. It indicated that the primary focus had been in the pelvic colon, where, about 6 - 7 inches from the anus a firm stricture of the bowel was found. Here was evidently the site of the original stricture for which he was first treated in the ward, and from this point had spread the diffuse cancerous growth which so quickly and surely brought about the death of the patient.
